



Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

Since, for any integral values of n , the numbers, $(n-1)$, $(n-2)$, $\dots$, $(n-p)$, are p consecutive integers, one and only one of them is divisible by p .

Suppose $(n-k)$ is divisible by p , i. e., $n \equiv k \pmod{p}$. Then the coefficient of A_k is p and all the other coefficients are zero.

Hence, when $n \equiv k \pmod{p}$, $f = A_k$ as required.

244. Proposed by CLIFFORD N. MILLS, Brookings, South Dakota.

Determine the rational value of x that will render $x^2 + px + q$ a perfect square. What value of x will render $x^2 - 7x + 2$ a perfect square?

SOLUTION BY HAROLD T. DAVIS, Colorado Springs, Colorado.

Let $x^2 + px + q = y^2$. Then $x^2 + px + (p^2/4) + q - (p^2/4) - y^2 = 0$, or $(2x + p)^2 - (2y)^2 = p^2 - 4q$.

(1) Let $2x + p = z$ and $2y = w$. Then $z^2 - w^2 = p^2 - 4q$; or, if $4q > p^2$, $w^2 - z^2 = 4q - p^2$. Let a and b be complementary factors of $p^2 - 4q$. Then $z + w = a$ and $z - w = b$. Whence $z = (a + b)/2$ and $w = (a - b)/2$. Substituting these values in equations (1), we have

$$x = \frac{a + b - 2p}{4} \text{ and } y = \frac{a - b}{4}.$$

Example. $x^2 - 7x + 2 = y^2$. Here $p^2 - 4q = 41$, the complementary factors of which are 41 and 1. Hence,

$$x = \frac{41 + 1 - 14}{4} = 14 \text{ and } y = \frac{41 - 1}{4} = 10.$$

A complete discussion of the solution of the general equation of the second degree in two variables is given in Chrystal's *Algebra*, Part II, page 458.

Also solved by HORACE OLSON, NORMAN ANNING, H. N. CARLETON, O. S. ADAMS, J. A. COLSON, J. L. RILEY, N. PANDYA and J. H. WEAVER.

QUESTIONS AND DISCUSSIONS.

SEND ALL COMMUNICATIONS TO U. G. MITCHELL, University of Kansas, Lawrence.

REPLIES.

33. Under what conditions or to what extent is Mr. Iwerson's construction, given below, a useful or practical approximation to a true ellipse? What criterion can be given to measure definitely the degree of approximation?

Mr. Iwerson's approximate construction for an ellipse by ruler and compasses alone, having given the axes, was given in the November, 1916, issue of the MONTHLY, pp. 354, 355. The following corrections should be made: In the last two lines on p. 354, Ox should be OY , and Oy should be OX .

Note. In the February issue of the MONTHLY (pp. 90-92), we published a reply to this question by Professor Capron, of the U. S. Naval Academy. Before the February issue had come from the press, Professor Howland, of Wesleyan University, sent in the reply printed below. These two discussions are, accordingly, independent and from entirely different points of view. Professor Capron took as his primary measure of approximation the proportional errors in the radii of curvature at important points. Professor Howland has taken as his measure of approximation the ratio of the distance between the true and constructed curves (measured vertically or normally) to the semi-major axis. The two discussions seem to overlap in but one place. What Professor Capron has called the proportional error in the length of the minor axis and designated as E_1 , corresponds to a maximum value of Professor Howland's relative divergence, d_2/a , which for some eccentricities occurs at $x = 0$. There is some slight difference in the formulas since in the one case the error is given relative to the semi-minor and in the other case relative to the semi-major axis.